

Message

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**Subject:** Chloroprene PBPK: metabolic parameters / IVIVE calculations  
**Attachments:** EPA Supp Mat D - Metabolism Parameter Calculations\_QA.xlsx

Greetings,

While I can't speak to the ultimate numerical significance, there are a number of discrepancies in and among the descriptions and calculations for IVIVE of metabolic parameters (i.e., between statements in the main report, p. 9, Supp Mat C, and the spreadsheet, Supp Mat D), and a couple of choices that I'm questioning. See below.

I would need to request a copy of Houston and Galetin (2008), which might take a few days, so it would help if Ramboll can send a copy.

I've highlighted the items that seem most significant, where corrections in the IVIVE spreadsheet appear to be needed or the justification (40 vs. 45 mg/g microsomal protein in rat liver) seems a bit weak. A copy of the spreadsheet where I've highlighted cells of concern is attached.

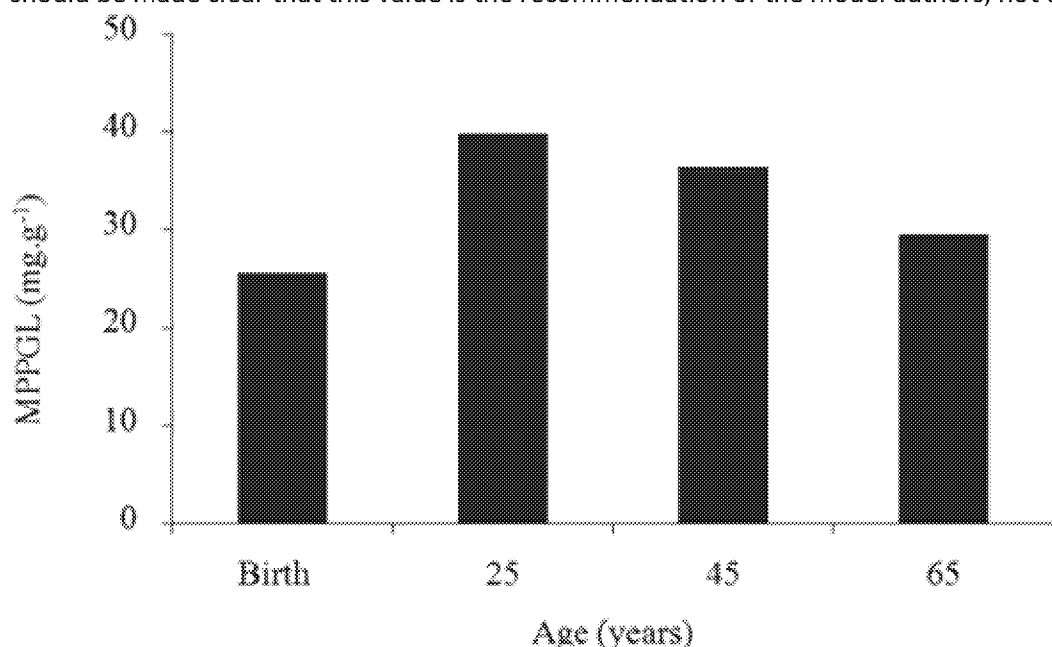
-Paul

#### Metabolic parameters and IVIVE extrapolation

The following are found in the spreadsheet, EPA Supp Mat D, in the "IVIVE" tab.

- **BW values for mice and rats, cells C22-C25:** these differ from the standard BW values listed in table S-1. For the sake of consistency, and since the tissues used to obtain microsomes were likely from juvenile/young adult animals, it might be better to use the lower, standard BW values from Table S-1. Alternately the Supp Mat C, Table 1 (which match the values in the Supp Mat D, IVIVE table), should be used in the model code for dose calculations in the absence of study-specific values.
- **Liver and lung microsome content, cells G22-G27 (liver) and cells H22-H26 (lung in all species):**
  - **Mouse liver:** From Supp Mat C, value of 35 mg/g is from Medinsky et al. (1994), so reference in cell G27 is incorrect (says "rat value used for mouse")
  - **Rat liver:**

- report p. 9 says 45 mg/g used for rats, not consistent with 40 in IVIVE spreadsheet (cells G24-25);
- need to obtain Houston and Galetin (2008);
- Supp Mat C says an average of values for rat from Medinsky et al. (1994) (sentence is confusing, “For mouse, 35 mg/g liver was reported by Medinsky et al. (1994) for both rat and mouse,”) and 45 mg/g from Houston and Galetin, but it’s not entirely clear why a cross-species average would be used for the rat, but not the mouse ; if Medinsky et al. (1994) also measured 35 mg/g from rat liver, then an average may make sense...
- In Barter et al. (2007), Figure 2, part A, there appear to be many papers reporting 45 mg/g for the rat, so the value of 45 mg/g may be better supported;
- reference in cell 27 just cites Houston and Galetin (2008), not consistent with “40”.
- **Human liver:**
  - Text in main report, p. 9, says 40 mg/g, which matches the value listed in Supp Mat C;
  - But IVIVE cell G26 has **50 mg/g**;
  - Supp Mat C, “Based on their meta-analysis and consensus report of the human data (Barter et al., 2007), 40 mg/g liver is recommended for human adults for chloroprene IVIVE-PBPK modeling,” so it would be less confusing if the main report and IVIVE cell G27 cited this reference, not Barter et al. (2008)
  - From Barter et al. (2007): “Values of MPPGL were approximately 36 and 31% lower in newborn and elderly (80 years) individuals than those in a 25-year-old individual (typically the age of individuals used in clinical pharmacology studies). The use of a value of MPPGL of 40 mg g<sup>-1</sup>, determined for a young adult, would be expected to result in an overprediction of clearance in very young or very old patients. Therefore, MPPGL values relevant to the age of the population in which predictions are being made should be used in IVIVE.” Image below is from Barter et al. (2008). Should risk assessment be focused on young adults, or entire population; i.e., use more of a population-average value from this reference? The young-adult value of 40 mg/g likely will be most health-protective.
  - But the statement in Supp Mat C appears to mis-represent the conclusions of Barter et al. (2007): it should be made clear that this value is the recommendation of the model authors, not the cited paper.



- **Lung:** value of 23 mg/g in cells H22-26 does match Himmelstein et al. (2004b), but text in the report says 20 mg/g, and this is the conclusion after some discussion in Supp Mat C. Hence it appears that the value in the IVIVE tab (used) should be 20 mg/g and the reference in cell H27 should be changed to Medinsky et al. (1994).

- **In Vitro Values of KFLUC for female rat (cell V33) and male rat (cell V38):** These cells have calculations which are not explained and do not take values from the in vitro metabolic results; e.g., “ $=1.2/(0.82*2)/1000$ ” in cell V33, which should be just equal to Parameter\_Summary cell I18.